IN THE CLAIMS

Kindly include the following claims:

Claim 1. (original) A device for scheduling virtual channel connections carrying cell traffic of different categories of service onto a virtual path connection comprising: aggregating means for aggregating virtual channel connections of similar categories of service into a single cell stream.

Claim 2. (original) A device as defined in claim 1 wherein virtual channel connections carrying different categories of service are queued in separate queues.

Claim 3. (original) A device as defined in claim 2 wherein said aggregating means includes means to form groups of said separate queues

Claim 4. (original) A device as defined in claim 3 wherein said aggregating means includes arbitration means.

Claim 5. (original) A device as defined in claim 4 wherein said aggregation means includes means to form per-VCC like-service-category queues and said arbitration means arbitrates priority as between said like-category-queues.

Claim 6. (original) A device as defined in claim 5 wherein said arbitration means includes means to arbitrate priority as between said separate queues within said groups of queues.

Claim 7. (original) A device as defined in claim 1 including multi-level arbitration means to arbitrate between virtual channel connections in an hierarchical manner.

Claim 8. (original) A device as defined in claim 6 including shaper means to determine egress time of cells in said single cell stream.

Claim 9. (original) A device as defined in claim 8 wherein said egress time is shaped in accordance with traffic descriptors specified for said virtual path connection.

Claim 10 (original) A device for shaping virtual channel connections carrying cell traffic of different categories of service onto a virtual path connection comprising: queuing means for queuing cells of like-

service-categories; arbitration means for arbitrating between said queues; and shaper means for shaping said cells into a single cell stream on said virtual path connection.

Claim 11. (original) In an ATM data communications network utilizing virtual channel connections wherein said virtual channel connections are aggregated at an aggregation point onto virtual path connections, an apparatus for shaping ATM cell traffic comprised of various categories of service onto said virtual path connection, said apparatus comprising:

queuing means for queuing cells from each of said virtual channel connections;

arbitration means to arbitrate between said virtual channel connection traffic; and

a virtual path connection shaper to determine egress emission time of cells from said arbitration means onto said virtual path connection.

Claim 12. (original) An apparatus as defined in claim 11 wherein said virtual channel connections carry different categories of service cell traffic.

Claim 13. (original) An apparatus as defined in claim 12 wherein said queuing means queues said virtual channel connections according to said category of service.

Claim 14. (original) An apparatus as defined in claim 13 wherein said arbitration means arbitrates priority as between said virtual channel connections.

Claim 15. (original) An apparatus as defined in claim 14 further including second arbitration means to arbitrate priority as between categories of service.

Claim 16. (original) An apparatus as defined in claim 15 wherein said categories of service comprise real time and non-real time service classes

Claim 17. (original) An apparatus as defined in claim 16 wherein said real time class of service include constant bit rate (CBR) and real time variable bit rate(rtVBR) traffic.

Claim 18. (original) An apparatus as defined in claim 16 wherein said non-real time class of service includes non-real time variable bit rate (nrtVBR), available bit rate (ABR) and unspecified bit rate (UBR).

Claim 19. (original) An apparatus as defined in claim 11 wherein said shaper determines egress time of cells in accordance with traffic descriptors.

Claim 20. (original) An apparatus as defined in claim 19 wherein said traffic descriptors include peak cell rate (PCR), sustained cell rate (SCR) and maximum burst size (MBS).

Claim 21. (original) An apparatus as defined in claim 15 wherein said second arbitration means utilizes an exhaustive round-robin arbitration scheme.

Claim 22. (original) An apparatus as defined in claim 15 wherein said second arbitration means utilizes a weighted round-robin arbitration scheme.

Claim 23. (original) An apparatus as defined in claim 15 wherein said second arbitration means utilizes a weighted fair queuing arbitration scheme.

Claim 24. (original) In an ATM data communications network having virtual channel connections channel aggregated at an aggregation point onto virtual path connections, a method for fairly shaping ATM cell traffic comprised of various categories of service and quality of service parameters onto said virtual path connection, said method comprising the steps of:
queuing said virtual channel connection cell traffic in separate queuing buffers;
arbitrating between said separate queuing buffers utilizing an arbitration means; and
shaping said arbitrated cell traffic with a virtual path connection shaper in order to fairly emit said cell traffic onto said virtual path connection.

Claim 25. (original) A device for arbitrating and shaping virtual channel connections (VCC) onto a virtual path connection (VPC) wherein said virtual channel connections carry ATM cell traffic of different categories of service, said device comprising: queuing means for forming per-VCC queues containing similar category of service cells; first arbitration means within each per-VCC queue for arbitrating priority between similar category of service cells; a second arbitration means for arbitrating priority between said per-VCC queues; and shaper means for determining egress time of said cells from said second arbitration means onto said virtual path connection.

Claim 26. (original) A device as defined in claim 25 wherein a third arbitration means arbitrates between some of said per-VCC queues with the results of said third arbitration means being arbitrated by said second arbitration means together with the other per-VCC queues.

Claim 27. (original) A device as defined in claim 26 wherein said first arbitration means is a round robin scheme.

Claim 28. (original) A device as defined in claim 26 wherein said second arbitration means is an exhaustive round robin scheme.

Claim 29. (original) A device as defined in claim 26 wherein said third arbitration means is a weighted round robin scheme.

Claim 30. (new) A method of emitting traffic carried over a plurality of virtual connections aggregated onto a single virtual connection comprising:

determining when, in accordance with a traffic descriptor, traffic from the single virtual connection is to be emitted; and

selecting the traffic to be aggregated onto the single virtual connection from the plurality of virtual connections for emission at a determined time.

Claim 31 (new) The method as defined in claim 30 wherein said traffic to be aggregated into the single virtual connection is selected by a hierarchical arbitrator which firstly arbitrates amongst groupings.

Claim 32. (new) The method according to claim 30 wherein the plurality of virtual connections are virtual channel connections and the single virtual connection is a virtual path connection.

Claim 33. (new) The method according to claim 30 wherein the traffic descriptor is one of: peak cell rate (PCR); sustained cell rate (SCR) and maximum burst size (MBS).

Claim 34. (new) The method according to claim 31 wherein a round robin arbitration technique is employed.

Claim 35. (new) The method according to claim 31 wherein an exhaustive round robin arbitration technique is employed.

Claim 36. (new) The method according to claim 31 wherein a weighted round robin arbitration technique is employed.

Claim 37. (new) The method according to claim 31 wherein a weighted fair queuing arbitration technique is employed.

Claim 38. (new) The method according to claim 30 wherein traffic to be emitted is determined in a time domain.

Claim 39. (new) The method according to claim 30 wherein emission of the selected traffic is signaled by an arbitration block.

Claim 40. (new) The method according to claim 39 wherein a queue manager dequeues the selected traffic for emission.